

The PLUTO “Please Let Us Take Off” project

in secondary science classrooms

How did the project lift off?

“I remember meeting Paul Lowe seven years ago at a HOD Science workshop. Paul from Morrinsville College was presenting his doctorate research on COLA (Co-operative Learning and Assessment) and thinking this man is extraordinary and I would like to work with him one day” says Simon Taylor- Secondary science adviser, based in Tauranga.

It took five years later to actually put that idea into reality. And so the “PLUTO” project was launched in January in 2009 to engage and raise achievement for year 9 and 10 science students in 12 secondary schools with particular emphasis to Maori students across the Waikato and BOP regions, (Mercury Bay Area school, Hamilton’s Fraser High, Fairfield college, Tauranga Girls College, Te Puke High School, Tauhara College, Te Awamutu College, Waikato diocesan for Girls, Putaruru High School, Cambridge High School, Forest View High School and Morrinsville College).



Dr Paul Lowe being awarded the Royal Society Prime Minister Science award in March this year .

Paul and I wanted to try out something new, a sustained long term project that was collaborative with teachers but at the same time explorative. We had been frustrated from earlier professional learning that seemed to focus on one off workshops and charismatic presenters who glossed over the practical workings of a “real” year 9 or 10 science classroom. However, the Te Kotahitanga

initiative certainly influenced my approach as an adviser working with schools. Its emphasis on teaching as inquiry and the heightened focus on using student voice to inform changes to the learning environment has been instrumental. I also had been working with teachers in creating relevant programmes for Maori students that would respond to their needs and values. Paul had come from another angle and had designed problem based tasks using a team based philosophy. As you can imagine we spent many hours usually over the phone on Sunday nights discussing our vision and how we could amalgamate rich learning contexts with team based learning!



Students building a skeleton race track- Physics of sport topic.

We are fortunate this year that the project has grown and we have 16 teachers on board, some highly experienced classroom practitioners such as Peter Hampton from Hamilton Fraser High School and Roger Cox at Fairfield College, some with remarkable ICT skills but most importantly all willing to work as a team and comfortable about trying out some very different teaching strategies that you don't often see in secondary science classrooms.



Students talking candidly about working together and how to be a successful team.

Teachers have used the student interviews as a reflective tool to focus on their inquiry.

The name ‘PLUTO (*Please Let Us Take Off*)’, has stuck and I’m glad we didn’t go with Uranus! The use of student voice has been a successful tool to activate and stimulate discussion with the teachers. It acts as a mechanism to make changes in the learning environment that is not confrontational. We have been collecting data from video interviews and a quantitative questionnaire called the CLES “Constructivist Learning Environment Survey” developed by Prof. Darrell Fisher from Curtin University, Australia. Darrell is the supervisor of the research part of the project and I am working away at my doctorate with him.

Assessment tools used last year in the western Bay of Plenty region with 5 secondary schools indicate 22 % of students were operating at level 2 of the curriculum when the students enter their secondary schooling. At the same time, 17% of the student intake of the year 9 cohort were observed to operate at level 5 of the curriculum. Only 38% of Maori students in one school achieved level 4 or better. Hence there are strong indications that there is a diverse range of student understandings when year 9 students enter secondary school. The need for differentiation in learning in the secondary science classroom seems ever more apparent and the details of the changes in teaching practice need to be further explored and investigated.



Students working in teams on the Bio dome inquiry.

The previous 1993 curriculum had marked a new direction, away from a focus on content and activities to one based on outcomes. The 2007 NZ curriculum goes further and has sparked a new approach for students to become more autonomous in their learning but also preparing them to work together. The potential for schools and teachers is boundless and it has given them the flexibility to actively involve students in what they learn and how to learn. It is this model of student learning and teaching that PLUTO is exploring.

So what could happen in a PLUTO class?

Students have access to the internet in the laboratories, projects can be inquiry based using “Big questions” and students work in teams of 2 or 3. One of the PLUTO protocols is that students work together in self selected teams and have the opportunity to be assessed in these teams. Their grades from the projects and assessments are shared. The model of collaborative action is mirrored from the real world. Eg A symphony orchestra, rugby team and students can have roles such as director, technician, and researcher in their teams.

Initially in the year students learn about learning and learning how to work collaboratively. The students are encouraged to share their values, personal interests and inquiry questions.

Some examples of the “big questions” for students:

“How could I survive in a bush fire?” “What do we need to put into this bio-dome and survive for two years?” “We want to be able to safely drink this water, how can we do it?” “How do Maori view water? How did they collect and use pre European?” “How can we survive a Tsunami?”